CLAIMS

1. (Amended) A machining data generator for generating machining data for shaping an external shape of a piston, said machining data generator comprising:
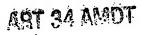
a spreadsheet software unit that describes noncircular part shape data defined by a longitudinal coordinate on an axis of a workpiece, an angular coordinate corresponding to the longitudinal coordinate, and a radial coordinate corresponding to the angular coordinate in a form of matrix data in a machining data sheet, and describes shape-data-describing-are-specifying data that specifies a cell region in which the matrix data is entered, and machining condition data that specifies machining conditions for shaping the noncircular part of the piston, after directives in the machining data sheet;

a noncircular part shape data fetching unit that recognizes the cell region specified by the shape-data-describing-area-specifying data in reading the machining data sheet and fetching the noncircular part shape data; and

a NC machining data calculating unit that recognizes the machining condition data described in the machining data sheet and that calculates NC machining data on the basis of the recognized machining condition data and the noncircular part shape data fetched by the noncircular part shape data fetching unit.

2. The machining data generator according to claim 1, wherein additional shape data on a part other than the noncircular part is described in the machining data sheet, and

the NC machining data calculating unit recognizes the additional shape data described in the machining data sheet together with the machining condition data and calculates NC machining data on the basis of the recognized machining condition data and the additional shape data, and the noncircular part shape data fetched by the noncircular part shape data fetching unit.

3. (Deleted)

4. (Deleted)

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5. (Deleted)

6. (Amended) The machining data generator according to claims 1 or 2, further comprising a graphic display unit that graphically displays the noncircular part shape data in a picture of a cross section of the noncircular part at a specified axial position, and a picture of an outline of the noncircular part cut along a reference longitudinal line in the picture of the cross section, placed beside the picture of the cross section, wherein the axial position of the cross section can be specified.

7. The machining data generator according to claim 6, wherein the graphic display unit includes an enlarging unit that displays a part of the graphically displayed noncircular part shape data in an enlarged picture.

8. The machining data generator according to claim 6 or 7, wherein the graphic display unit has a correcting unit that corrects the graphically displayed noncircular part shape data on a graphic display screen.

9. The machining data generator according to any one of claims 6 to 8, wherein the graphic display unit has a tolerance data display unit that graphically displays tolerance data on tolerances for the noncircular part shape data together with the noncircular part shape data.

10. (Amended) The machining data generator according to any one of claims 1, 2, 6, 7, 8, 9 and 16, further comprising a simulation display unit that graphically displays a machining position and a machining speed of a tool on a time axis as a reference axis on the basis of the NC machining data calculated by the NC machining data calculating unit.

11. (Amended) The machining data generator according to claim 10, wherein the simulation display unit indicates a time indication line that moves along the time axis on the graphic display screen displaying the machining position and machining speed of the tool, and displays information about a rotation of the spindle at a position indicated by the time indication line.

12. (Amended) A machining data generating method of generating machining data for shaping an external shape of a

piston, said method comprising:

preparing a machining data sheet <u>of a spreadsheet software for NC machining data calculation by describing noncircular part shape data specifying a noncircular part of the piston in a form of matrix data defined by a longitudinal coordinate on an axis of a workpiece, an angular coordinate corresponding to the longitudinal coordinate and a radial coordinate corresponding to the angular coordinate, and by describing shape-data-describing-area-specifying data that specifies a cell region in which the matrix data is entered, and machining condition data that specifies machining conditions for shaping the noncircular part of the piston, after directives in the machining data sheet</u>;

<u>recognizing the cell region specified by the shape-data-describing- area-specifying data when</u> reading the machining data sheet and fetching the noncircular part shape data <u>from the cell region</u>; and

recognizing the machining condition data described in the machining data sheet and calculating NC machining data on the basis of the recognized machining condition data and the fetched noncircular part shape data.

13. The machining data generating method according to claim 12, wherein additional shape data on a part other than the noncircular part is described additionally in the machining data sheet,

the additional shape data described in the machining data sheet is recognized together with the machining condition data, and the NC machining data is calculated on the basis of the recognized machining condition data and additional shape data, and the fetched noncircular part shape data.

14. (Amended) A computer-readable recording medium storing a machining data generation program for generating machining data on machining operations for shaping an external shape of a piston, to be executed by a computer, characterized in that the machining data generating program executes:

a procedure for preparing a machining data sheet <u>of</u>

spreadsheet software for NC machining data calculation by describing noncircular part shape data specifying a noncircular part of the piston in a form of matrix data defined by a longitudinal coordinate on a axis of a workpiece, an angular coordinate corresponding to the longitudinal coordinate and a radical coordinate corresponding to the angular coordinate, and by describing shape-data-describing-area-specifying data that specifies a cell region in which the matrix data is entered, and machining condition data that specifies machining conditions for shaping the noncircular part of the piston, after directives in the machining data sheet;

a procedure for recognizing the cell region specified by the shape-data-describing-area-specifying data when reading the machining data sheet and fetching the noncircular part shape data from the cell region; and

a procedure for recognizing the machining condition data described in the machining data sheet and calculating NC machining data on the basis of the recognized machining condition data and the fetched noncircular part shape data.

15. The recording medium according to claim 14, wherein additional shape data on a part other than the noncircular part is described in the machining data sheet, and

the machining data generating program further executes a procedure for recognizing the additional shape data described in the machining data sheet and the machining condition data and calculating NC machining data on the basis of the recognized machining condition data and additional shape data, and the fetched noncircular part shape data.

16. (Added) The machining data generator according to any one of claims 6 to 9, wherein the graphic display unit is adapted to turn a cross section of the noncircular part at a specified longitudinal position at a predetermined angular interval.